



PUBLIC NOTICE

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DA 21-1025
Released: August 20, 2021

WIRELESS TELECOMMUNICATIONS BUREAU SEEKS TO REFRESH THE RECORD ON UNMANNED AIRCRAFT SYSTEMS USE OF THE 5 GHZ BAND

RM-11798

Comments Due: 30 days from publication in the Federal Register
Reply Comments Due: 45 days from publication in the Federal Register

Unmanned aircraft systems (UAS) are increasingly used for a wide variety of recreational, commercial, and governmental applications that provide significant benefits to the nation. These include, among many others, inspection of towers, pipelines, and buildings, aerial photography, mapping, surveillance, deliveries from consumer packages to critical medical supplies, and support for emergency operations like search and rescue, post-hurricane recovery, and wildfire response. Realizing the full potential benefits of UAS and safely integrating these growing UAS operations into the nation's airspace will, however, require access to licensed spectrum and appropriate service rules. While UAS communications have primarily relied on unlicensed access to spectrum, some UAS proponents assert that licensed spectrum will increasingly be needed to provide both the spectrum capacity to support future growth and the reliability needed for safe operations to protect life and property in circumstances such as flights in populated areas or beyond-line-of-sight. With this Public Notice, the Wireless Telecommunications Bureau seeks to refresh the record in this proceeding, which was commenced to consider a petition filed by the Aerospace Industries Association (AIA) on February 8, 2018 to address the growing need of the UAS industry for access to licensed spectrum. In its petition, AIA asked the Commission to adopt licensing and service rules for Control and Non-Payload Communications (CNPC) links in the 5030-5091 MHz band to support UAS operations in the United States (AIA Petition).¹ AIA's petition was put out for public comment on April 26, 2018.²

We issue this Public Notice to update the record to reflect operational, technical, and regulatory developments that have occurred over the last three years in the rapidly growing and evolving area of UAS operations and that are relevant to this proceeding. We also seek to explore certain aspects of the AIA proposal in greater detail than is reflected in the current record. Finally, because the focus of the AIA proposal and the resulting comment record appears to be in support of direct radio-line-of-sight (LOS) communications links between controller and unmanned aircraft, we seek comment on whether the Commission should consider licensing alternatives in this band to support the growing interest in beyond-

¹ See Petition of AIA for Rulemaking to Adopt Service Rules for Unmanned Aircraft Systems Command and Control in the 5030-5091 MHz Band, RM-11798 (filed Feb. 8, 2018) (AIA Petition).

² See *Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemakings Filed*, Public Notice, Report No. 3089 (CGB Apr. 26, 2018), <https://ecfsapi.fcc.gov/file/042644009469/DOC-350441A1.pdf>. Eight parties filed comments, and four filed replies.

radio-line-of-sight (BLOS) UAS operations.³ We anticipate that the resulting record could help the Commission to proceed with a more informed and specific Notice of Proposed Rulemaking to make the 5030-5091 MHz band available as a suitable spectrum resource for UAS operations.⁴

AIA Proposal

In its petition, AIA proposed that individual UAS operators, e.g. pilots-in-command (PICs), that meet certain qualifications or organizations that employ such operators be able to obtain a non-exclusive, nationwide Commission spectrum license that would authorize operators to use the band subject to a dynamic frequency assignment process. Under this proposed process, licensees could, upon request to a frequency coordinator, obtain operational access to a subset of frequencies in the band for a limited geographic area and duration tailored to a specific flight.⁵ AIA further proposed that operators be subject to flexible technical rules, but recommended in a supplement that operators of CNPC links in the 5030-5091 MHz band be required to follow the “relevant Federal Aviation Regulations [] as prescribed by the Federal Aviation Administration [] for their particular types of operations.”⁶ AIA also recommended that the Commission prohibit any use of the 5030-5091 MHz band by UAS for “payload communications or other non-safety or non-route services.”⁷

We seek updated and additional comment on all aspects of the AIA proposal as a licensing approach for UAS operations in the 5030-5091 MHz band, and in particular, the aspects discussed below.

License eligibility. We seek comment on whether, as proposed by AIA, the Commission should require that parties seeking a 5030-5091 MHz band spectrum license must certify they have the requisite FAA remote pilot certification, or, in the case of organizations, to certify that they will utilize only individuals with such qualifications for their UAS operations in the band. Given that UAS operators would in any case be subject to applicable FAA regulations, including regulations requiring the relevant FAA pilot certification, we seek comment on the benefits of conditioning license eligibility on compliance with such requirements.

Dynamic frequency assignment. As mentioned earlier, a central element of the AIA Petition proposal is a dynamic frequency assignment management system, which would automatically process requests from licensees for temporary assignment of bandwidth in the 5030-5091 MHz band in a specified geographic area or path covering the anticipated flight path, for a specified duration covering the anticipated flight duration. Under the AIA proposal, requests would need to be made a short time before the expected flight (AIA suggests no more than 20 minutes), and at the end of the estimated flight duration, or some “reasonable” period after, the assigned frequencies would automatically become available for reassignment.⁸ We seek comment on this proposal, including the feasibility and practicality of implementing and operating a dynamic frequency assignment management system for this purpose, any current or planned technologies or systems that could perform the necessary functions and are scalable to meet the real-time coordination needs of a large and growing number of operations, and what new or modified technologies, devices, connections, or standards would be needed to implement this approach. For example, Spectrum Access Systems are automated frequency coordinators that the

³ We use the term radio-line-of-sight to refer to operations where the unmanned aircraft can be contacted by direct radio link from the controller. A related but different concept, visual-line-of-sight, involves operations where the unmanned aircraft can be visually seen by the controlling pilot.

⁴ We do not, however, anticipate that rules governing UAS operations in the 5030-5091 MHz band would necessarily be applicable to UAS operations in other bands.

⁵ See AIA Petition at 6-7, 9-10.

⁶ See AIA Petition at 12, 14-15; AIA Supplement to Petition for Rulemaking, RM-11798, 3-4 (filed June 26, 2019).

⁷ AIA Petition at 10.

⁸ See AIA Petition at 14-15.

Commission established in the 3550-3700 MHz band to coordinate and implement spectrum access and prioritization among users of three different tiers of services in that band with ascending priority rights.⁹ Would this technology be appropriate here? We seek comment on the status of pending standards work relevant to implementing a dynamic frequency assignment approach for UAS access to the 5030-5091 MHz band, and to the extent additional standards work would be required. We seek comment on the process for authorizing the frequency assignment manager, on minimum eligibility requirements or restrictions for applicants, and on whether we should permit more than one manager. We further seek comment on any requirements or standards governing requests for assignment of frequencies and the processing of these requests, and whether the standards and processing procedures for requests should be left to the discretion of the manager.

AIA proposes that the Commission require licensees to “release” assignments at the end of the flight, and that assignments be automatically “revoked” some period after the estimated duration of the flight if not otherwise released.¹⁰ We seek comment on these aspects of AIA’s proposal. We seek comment on what, if any, enforcement mechanism to impose on the requirement that assignments be released at the end of the flight. We also seek comment on what connections or communications between the frequency assignment management system and UAS stations will be needed to implement these processes. Would revocation create potential safety concerns if revocation occurred while a flight was ongoing? If so, how should such concerns be addressed? We seek comment on any requirements needed to ensure that these processes, as well as the initial processing of requests, occur in a manner that is secure, reliable, and timely.

Technical requirements. We seek comment on the appropriate technical requirements and parameters. In its petition, AIA states that the technical rules for CNPC links in the 5030-5091 MHz band should be flexible to support ongoing UAS development, but also proposes certain technical parameters based on the technical standard RTCA DO-362. Specifically, AIA proposes that:

- Transmitter power and emissions in the 5030-5091 MHz band should conform to the requirements in RTCA DO-362 § 2.2.1.6.
- The frequency accuracy of a 5030-5091 MHz CNPC transmitter, or of the local oscillator of a 5030-5091 MHz CNPC receiver, should not vary more than 0.2 parts per million (ppm) from the intended value, as stipulated in RTCA DO-362 § 2.2.1.4.
- Emission limits for Aeronautical Stations and Aircraft Stations indicated in Section 87.139(c) of the Commission’s rules be applicable to such stations that are capable of operating in the 5030-5091 MHz band to support UAS CNPC links, in addition to the emission limits imposed by RTCA DO-362 § 2.2.1.6.32.

We request comment on these parameters and any other parameters that must be considered, including whether an altitude limit on UAS use of the 5030-5091 MHz band should be established to maximize the spectral efficiency of the band.¹¹ We also request comment on the emission limitations of section 87.139, and whether any changes are necessary to accommodate UAS operations, especially those considered in RTCA DO-362. We also request comment on any additional technical limitations necessary to protect the AeroMACS bands, 5000-5030 MHz and 5091-5150 MHz.

Scope of permitted services. We seek further comment on the scope of services to be permitted in the band. The relevant allocation of the band to aeronautical mobile (route) service (AM(R)S) may be

⁹ See *3.5 GHz Band Overview*, <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview> (Mar. 10, 2020).

¹⁰ See AIA Petition at 14-15.

¹¹ We do not request comment on altitude limits applicable to use of other spectrum or to UAS operations generally. We note that the FAA imposes UAS altitude limits to ensure safe operation of UAS in the national airspace system.

used only for communications “relating to the safety and regularity of flight.”¹² We seek comment on what types of UAS communications fall within the scope of this allocation, and on whether all UAS communications that are within the scope of AM(R)S should be permitted. We further seek comment on whether CNPC generally are consistent with the allocation and its purpose, whether we should permit all UAS CNPC communications in the band while prohibiting UAS payload or non-UAS communications, and if so, how CNPC communications and payload communications should be defined for the purpose of these rules. We also seek comment on whether to adopt an approach that combines a broad scope of permitted communications with a prioritization mechanism. For example, should we permit UAS payload communications in the band or non-UAS general purpose communications subject to the prioritization of UAS CNPC? We seek comment on whether permitting such services would require the Commission to modify the current allocation of the band, and if so, whether the band allocation should be modified as necessary to permit payload and/or non-UAS general purpose mobile communications on a secondary basis and subject to some scheme of CNPC priority.

Alternative Approaches Supporting BLOS Use

As mentioned, the focus of the AIA proposal appears to be in support of direct LOS communications links between controller and unmanned aircraft. The proposal would provide operators with highly transitory spectrum assignments tailored in both geography and time to specific flights. We seek comment on whether the spectrum assignment model proposed by AIA would provide sufficient scope and certainty to incentivize the deployment of network infrastructure that can support both LOS and BLOS flights. We seek comment on the extent to which additional or alternative approaches to licensing the 5030-5091 MHz band might better support such deployment, or otherwise be more effective in supporting BLOS flights in particular, or UAS flights overall. To the extent that commenters advocate for alternatives, we ask them to submit specific, detailed, and comprehensive proposals for licensing the 5030-5091 MHz band to support UAS communications.

We seek comment on whether alternatives to the AIA proposal might provide better support for BLOS communications. We note that while UAS operations have in the past been predominantly LOS, there is growing interest in and exploration of BLOS operations, such as for package delivery, mapping, search-and-rescue, long-range infrastructure inspections, and surveillance flights. We seek comment on the anticipated uses of the 5030-5091 MHz band, the extent to which there is interest in use of the 5030-5091 MHz band for BLOS operations in particular, and the type of infrastructure necessary to support such use. We anticipate that BLOS communications will require the deployment of network infrastructure, and seek comment on this assessment, and on whether licensing the band with exclusive geographic area-based licenses would more effectively promote such deployment, and on the costs and benefits generally of such an approach. We further seek comment on what specific license terms would be appropriate for a geographic area-based license approach to the band, including the appropriate geographic area, spectrum block size, license duration, performance requirements, permissible service scope, and technical requirements. We seek comment on whether adopting relatively larger geographic areas, such as Regional Economic Area Groupings, is justified to better support long-range, BLOS UAS operations. We seek comment on a spectrum block size that will maximize the utility and benefit of the band, considering factors such as the benefits of competition from multiple providers, the expected spectrum needs and demand level of UAS operations, and the interest in accommodating, as much as is practical, a range of UAS operations that may have significantly varying bandwidth requirements. Regarding license duration and performance requirements, we seek comment on a ten-year renewable license and establishing population-based buildout requirements, similar to what the Commission has established in many other mobile network bands.

We further seek comment on other alternatives that do not require an operator license. As discussed above, AIA proposes that we require operators or organizations that employ them to hold a

¹² See 47 CFR § 2.1(c).

nationwide, non-exclusive license before they can receive spectrum assignments. We seek comment on whether this aspect of the proposal is necessary for this type of service, or whether an approach could be implemented that does not require any operator license but relies instead on some form of station license, with station equipment held to technical requirements (such as RTCA DO-362 requirements) in the Commission's equipment authorization process. For example, we seek comment on whether to adopt licensed-by-rule station licensing for the band, analogous to aircraft station licensing under Part 87.¹³ Under this approach, operators would not need a separate spectrum license from the Commission, and equipment that met Commission equipment authorization requirements would be licensed automatically, although potentially still subject to an automatic frequency assignment or reservation process such as the dynamic assignment process proposed by AIA. We seek comment on whether, under this approach, ground stations should be separately licensed, whether we should provide site-based licenses to cover such stations, and the costs and benefits of this approach. Is site-based licensing practical to implement very temporary assignments (e.g. assignments for uses lasting only a few hours or days)? How would site-based licensing address operations that involve hand-held or portable controllers rather than fixed stations? If we were to adopt such an approach, what rules should we adopt to foster efficient use of spectrum and to avoid interference? How should we define the permissible scope of a site and the duration of the license? What coordination requirements and mechanisms should we adopt?

We also invite comment on hybrid approaches to licensing the band. For example, we seek comment on whether to partition the band into two segments, one in which we adopt an approach like the AIA proposal, the other in which we issue exclusive geographic area licenses for network-based services. If so, should we split the band equally between the two segments, or assign more spectrum to one of them? We further seek comment on options that might support both approaches in the same segment of the band. For example, should the frequencies subject to geographic area licensing nevertheless be assignable for temporary direct links in a particular geographic area through an approach such as the AIA proposal until the relevant geographic area licenses in that area are actually assigned to a licensee? Or should we allow such access unless the spectrum is actually "in use," e.g., providing licensees in the direct link segment of the band with access to the spectrum in the segment subject to geographic area licensing except in those license areas with at least some actual deployment, or except within the signal coverage of deployed base stations?

Procedural Matters

Pursuant to sections 1.415 and 1.419 of the Commission's rules,¹⁴ interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- **Electronic Filers:** Comments may be filed electronically using the Internet by accessing the ECFS: <http://www.fcc.gov/ecfs/>.
- **Paper Filers:** Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

¹³ See 47 CFR § 87.18(b) (providing that an aircraft station is licensed by rule and does not need an individual license issued by the Commission if not otherwise required by law).

¹⁴ 47 CFR §§ 1.415, 1.419.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington, DC 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, DA 20-304 (March 19, 2020), <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.

People with Disabilities. To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer and Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

Ex Parte Rules. This proceeding shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.¹⁵ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must: (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made; and (2) summarize all data presented and arguments made during the presentation.

If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda, or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with section 1.1206(b) of the Commission’s rules.¹⁶ In proceedings governed by section 1.49(f) of the rules or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf).¹⁷ Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

Additional Information. For further information, contact Peter Trachtenberg of the Wireless Telecommunications Bureau, Mobility Division, at (202) 418-7369 or Peter.Trachtenberg@fcc.gov.

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¹⁵ See *id.* §§ 1.1200 *et seq.*

¹⁶ *Id.* § 1.1206(b).

¹⁷ *Id.* § 1.49(f).